



NTX

NASA/FAA North Texas Research Station

The NASA/Federal Aviation Administration (FAA) North Texas Research Station (NTX) is a field laboratory with unique capabilities to enhance the development, evaluation, and transition of advanced concepts and technologies for the Next Generation Air Transportation System (NextGen). Developed and managed by NASA Ames Research Center's Aviation Systems Division, NTX represents more than 17 years of collaboration with the FAA on air traffic management (ATM) research and technology transfer. NTX is located in the Dallas/Fort Worth (Texas) metroplex and features not only a network of high-fidelity operational air transportation data and sophisticated analysis tools, but represents established partnerships with a wide range of FAA, air carrier, and airport operational facilities.

NTX primarily supports NASA Aeronautics' NextGen research efforts as well as collaborative research activities led by NASA partners (e.g., the FAA, the inter-Agency Joint Planning and Development Office [JPDO] organizations, and the aviation industry). NTX is utilized in all phases of NextGen research, beginning from early concept development through execution of operational field evaluations of advanced prototype systems.

Unique Capabilities & Distinct Location

The NTX field laboratory houses a network

of computer systems to collect and analyze data from a large variety of sources in the National Airspace System and to simulate air transportation operations. The laboratory enables off-line, real-time "shadow" testing of prototype technologies in a secure environment. In large part due to its unique location and its direct access to the air transportation system, NTX provides tremendous benefits to research and technology transfer.

The NTX laboratory is located on the premises of the FAA's Fort Worth Air Route Traffic Control Center (ARTCC, or Center), immediately adjacent to the Dallas/Fort Worth International Airport (DFW), and is a few miles from Dallas-Love Field Airport. DFW is one of the top three busiest airports in the nation, and Fort Worth Center is the 11th busiest of 20 en route Centers. Airline operations centers for Southwest Airlines, American Airlines, and American Eagle are also in close proximity. Access to the data and personnel from these facilities, including permission to utilize the DFW backup central air traffic control tower, affords NASA researchers with the best possible capabilities to develop and test NextGen technologies in realistic and demanding air traffic conditions.

As a result of NTX's proximity to these many important air transportation assets, NASA

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has developed research partnerships with the air traffic control facilities, various airlines, and the DFW Airport Board. In addition, NTX has nurtured a close partnership with the FAA Southwest Region, headquartered in Fort Worth, and has, since 1999, maintained an ongoing collaboration with faculty and students at the University of Texas at Arlington. In 2012, the FAA designated NASA's NTX investment as a national, NextGen Test Bed along with two other FAA facilities in Atlantic City (NJ) and Daytona Beach (FL). These NextGen Test Beds are now linked by a secure, high-speed network to facilitate collaborative research.

Evaluating Developmental Systems with Operational Data

In addition to the laboratory building, NTX assets include research systems located in Center, terminal area, tower, and air carrier operational facilities, connected via a network of NASA research software systems. These systems may be used independently or in various combinations to meet changing research requirements, with user interfaces located in operational facilities to enable simultaneous evaluation of multiple developmental technologies. This capability allows rapid reconfiguration of research systems and components in a manner that is largely transparent to operational users, but which facilitates collaboration between researchers and operators.

Operational Field Evaluations and Technology Transfer

Since 1995, NTX has been the site of numerous field evaluations and simulations of NASA ATM decision support tools, including, most notably, the Traffic Management Advisor (TMA), playing a key role in technology transfer. In 1997, the FAA initiated its

Data Collection

NTX's close proximity to, and partnerships with, various local FAA and airline facilities provide NASA researchers with a wide variety of National Airspace System data that enhance their ability to test and evaluate advanced technologies for air traffic management problems to achieve NextGen objectives. The data available at NTX include:

- Live surface, terminal, and en route surveillance data
- Air traffic control plans and system status
- Air carrier plans and system status
- Pilot/controller radio communications
- Airport surface operations visual surveillance

nationwide deployment of TMA by installing the NASA TMA prototype at Fort Worth Center. To support this installation, NTX developed software systems and procedures to support routine TMA operations, which enabled the FAA to draw on this experience, and expand TMA capabilities, for the national deployment to other facilities. NTX has also evaluated terminal area scheduling automation, en route conflict prediction capabilities, and airline-air traffic collaborative tools and most recently NTX has contributed to the evaluations of the Efficient Descent Advisor (EDA) and collaborated with Boeing on the Direct Routes field evaluation.

Current and Planned Activities

NTX is currently supporting several research activities, including two that are conducting field evaluations in local operational facilities:

Precision Departure Release Capability (PDRC), developed at NASA Ames Research Center, improves tactical departure operations by enabling the automated exchange of airport surface operations data to en route tactical departure scheduling systems currently available only through voice communications. PDRC technology will reduce departure delays by more precisely scheduling departures into constrained en route traffic flows. The initial PDRC operational evaluation ran from May-July 2012 at NTX. During this evaluation, FAA traffic management coordinators at Fort Worth Center and DFW Towers used the prototype PDRC system to schedule 120 tactical departures. Follow-on evaluations are scheduled for late 2012 and early 2013. NASA will transfer PDRC technology to the FAA to help integrate tower and en route decision support tools being developed for NextGen.

Dynamic Weather Routes (DWR), developed at NASA Ames Research Center, is a ground-based trajectory automation system that helps dispatchers, traffic managers, and controllers identify tactical corrections to severe weather avoidance routes for in-flight aircraft in en route Center airspace. DWR suggests reroutes that consider modeled weather, wind-corrected flying time, traffic congestion, and traffic conflicts. Interactive functions enable users to easily visualize and modify proposed reroutes. NASA has partnered with American Airlines to evaluate DWR at the American Airlines Systems Operations Center adjacent to NTX. DWR shadow evaluations began in July 2012.

For more information on the North Texas Research Station (NTX), please visit

www.aviationsystems.arc.nasa.gov

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